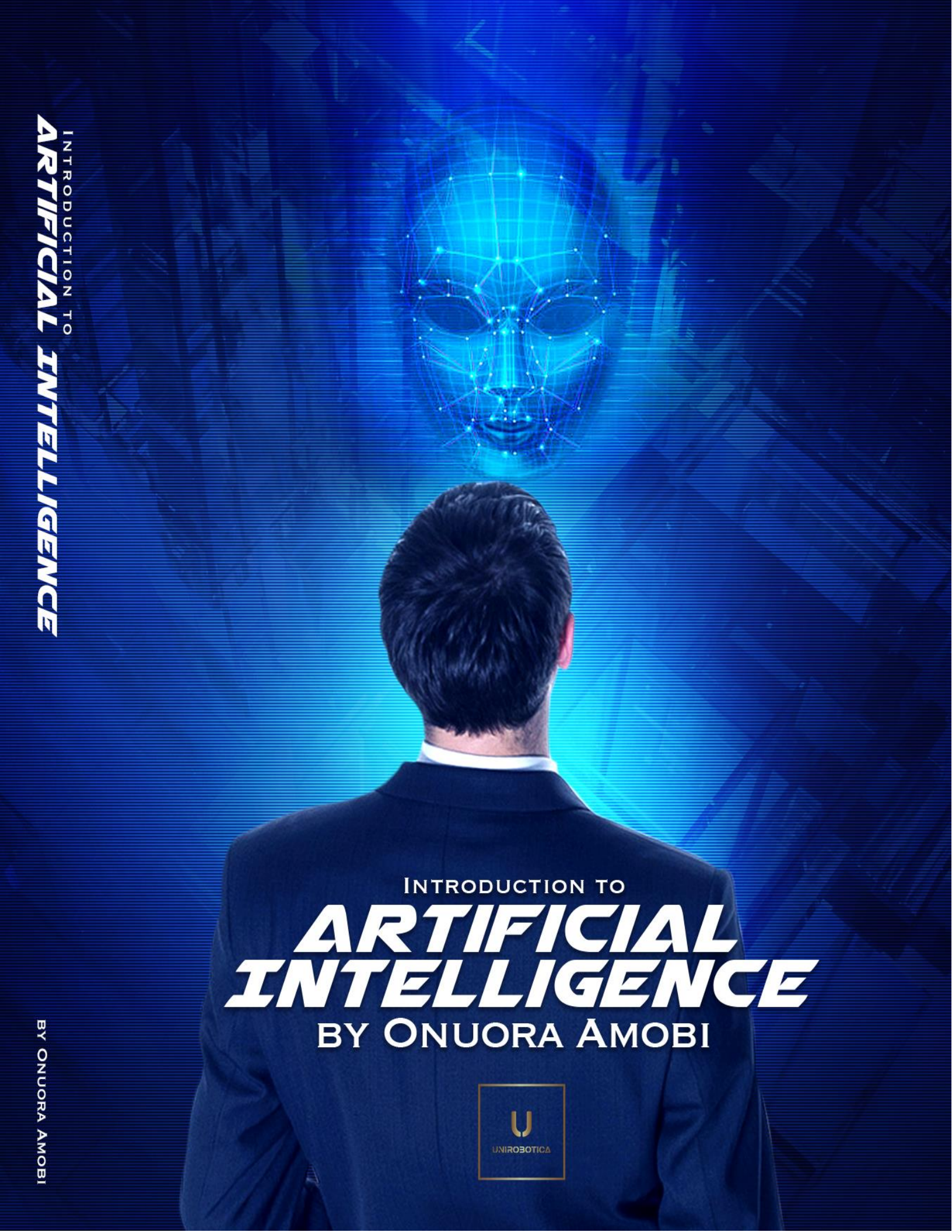
Introduction to
Artificial Intelligence
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By Onuora Amobi
UNIROBOTICA
By Onuora Amobi

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Contents

Introduction

Welcome to my quick guide on artificial intelligence where you will find out what AI is, why it matters to all of us, what it is used for and how it is evolving.

We can think of artificial intelligence as being a simulation of human intelligence relative to the intelligent processes needed for solving problems. Those intelligent processes include analysis, learning, perception, planning, reasoning, speech recognition, correction, linguistics and many more areas of cognitive sciences for humans.

AI makes things easy for us. Despite many people being wary of the technology, it does bring huge benefits to the human race. It is used in conjunction with machine learning, enabling machines to learn from experiences, amp their actions and their efforts to a set of results, adjust to random or new input values and lots of other human-like tasks through a deep analysis of various scenarios.

AI makes use of something called NLP or Natural Language Processing so that it can understand human communication methods, with internal translations turning it into a machine code. It also required Deep Learning techniques and, through these technologies, AI is able to train up computers to do tasks with the minimum amount of human intervention.

Some of the biggest benefits of AI include:

- Automating customer interactions, most of which currently rely on humans. With AI, emails online chat, calls, responses to queries, social media chat and more can all be automated and, to provide a much better customer experience, the AI systems store previous customer interactions and use them for analysis.

- Real-time assistance. This is most useful for organizations that are in constant contact with customers under tight time restraints. This includes airline ticket systems where customers need to be aware of real-time flight statuses and weather.

- Data mining. Cloud-based AI allows for large quantities of data to be analyzed and processed, giving companies much better insights into their customers and business processes which, in turn, allows them to make much better business decisions.

- Predictive power. AI systems use analysis of past data to make predictions about the future and this benefits online marketplaces and online inventory

management systems, giving them the leverage they need to boost sales and manage their inventory much better,

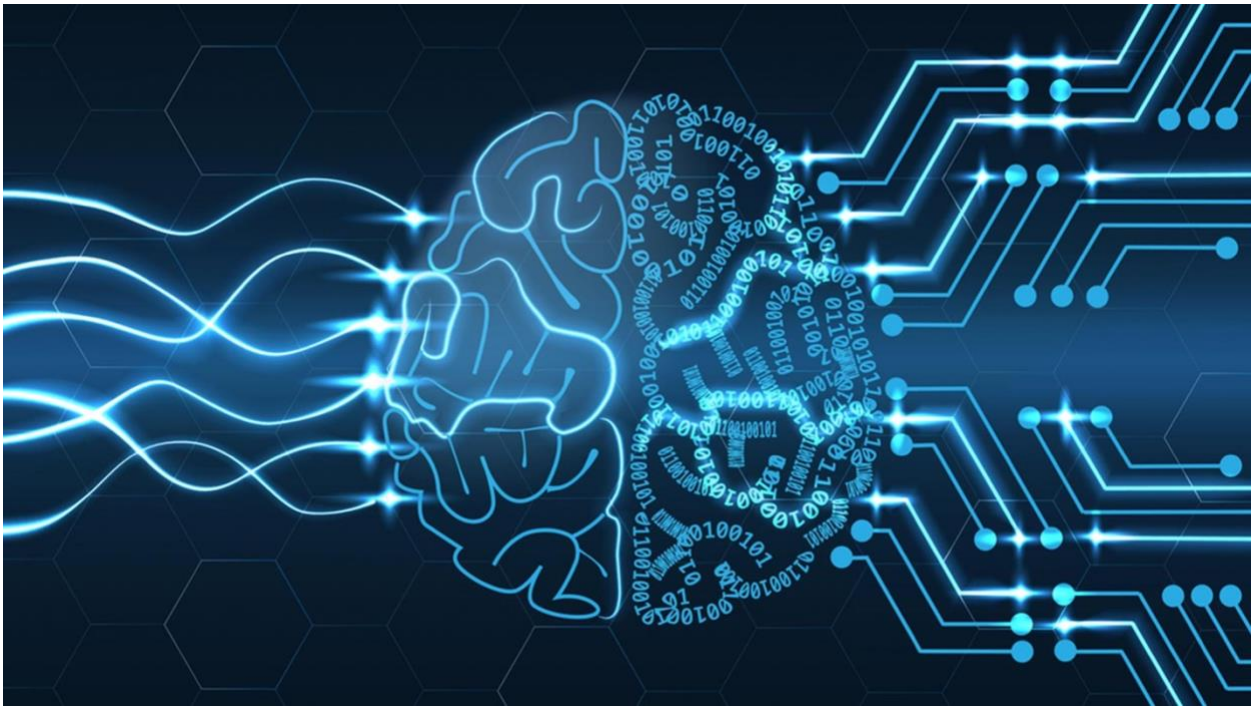
- Operational Automation. AI systems can collaborate quite easily with technologies across multiple fields. For example, home ventilation systems are a combination of intelligent heating and cooling, or the consumer food industries uses it for temperature control for freezer and refrigeration storage. And the use of RFID and cloud technology combined has made inventory tracking so much easier.

You will learn more about the benefits of AI in this guide, along with the disadvantages, some of the applications that AI is currently being used for, how you can and already do use it in your daily life, how it will affect your future and so much more.

So, welcome to the world of artificial intelligence. Let's dive in and see what it can do for you.

Thanks for reading this book. I hope you have as much fun reading it as I had writing it.

Let's get started.



Part 1: The Background

What is AI or Artificial Intelligence

There's more than one definition of artificial intelligence – "the study and design of intelligent agents" with the agent being a system that can perceive and understand its environment, doing things that maximize the chance of success.

Or it could be "the ability that a computer-controlled robot of digital computer has to perform tasks more commonly done by intelligent beings"; "the simulation of human intelligence processes by a machine, in particular a computer system, and including self-correction, reasoning and learning.

All of these describe AI or artificial intelligence and all of them are perfectly correct. But, in the long run, it all boils down to how well computers can imitate, even exceed, when they are compared to humans.

Different Types of Artificial Intelligence

What many people don't realize is that artificial intelligence falls into two main types.

Type 1

Type 1 falls into two categories – narrow and strong:

Narrow AI

Sometimes called 'weak' AI, this type of AI focuses on one single, narrow task, a phenomenon by which an unintelligent machine can be made to look like a smart one. One example would be a game of poker, where the rules and moves are given to the computer and where humans are beaten by machines, where every possible move must be fed into the machine manually beforehand. Every single narrow AI contributes to a strong one.

Strong AI

These are the machines that can work by themselves, perform tasks and think just like humans do. While there are no real examples, this is the one type that industry leaders are focusing their attention on and progress I moving along at a rapid pace.

Type 2

Based on functionality, type 2 falls into four categories – reactive, limited memory, theory of mind, and self-awareness:

Reactive Machines

One of the most basic AI forms, reactive machines do not have any memory of the past and they do not make use of any previous information for their actions. A good example of this is the IBM chess program that played Gary Kasparov and beat him more than 20 years ago.

Limited Memory

These are the AI systems that can make use of previous experience in making future decisions. A good example would be self-drive cars and Siri, the chatbot provided by Apple.

Theory of Mind

A type of AI that can understand human emotions, thoughts, beliefs and expectations and can also take part in social interaction. This is far from being perfect and much improvement is required in this field.

Self-Awareness

AI with a conscious of its own, self-aware, super-intelligent, sentient – a robotic version of a human being. Right now, this exists only in limited test form and, once it has been fully achieved, artificial intelligence really will have a life of its own.

What Makes Artificial Intelligence So Important Right Now?

We are, indeed, an incredibly privileged generation, surrounded by technology that advances with each passing day. Many can't even remember the days when we had to do everything for ourselves; we didn't have machines, computers, or software to do things for us.

And automated processes were once nothing but a pipe dream. That makes artificial intelligence one of the most important advances of all time, computers that do some of what we had to do for ourselves. AI is used daily and many people don't even realize they are using it, don't even realize how much easier their lives have been made by it.

AI reduces human involvement in many different areas, much faster, far more accurately and with fewer to no errors, not to mention the efficiency with which tasks are completed. Over time, more and more industries have taken to AI to reduce the burden on humans and to make their process efficient and almost instantaneous.

Banking and Finance

Perhaps one of the biggest uses is in the financial sector, where everything must be done with pinpoint accuracy. Human error, not to mention speed, are big factors in banks employing AI to handle many of their processes, faster and far more accurately than humans.

Medical Science

AI has turned medical science on its head, providing huge value in many different areas. Virtual personal health care assistants have been developed for analysis and research; healthcare bots provide round-the-clock support to patients, answering questions and even scheduling appointments.

Heavy Industry

Most major manufacturing companies now use AI in their production units, providing shape, speed in moving things from one place to another, even in management systems. AI is used for record-keeping, storage of important company information, easy to extract when it comes to making decisions. Tasks are done on time and accurately, all but eliminating the issues and costs that come with falling behind on production.

Air Transport

Air transport is a systematic system and it really cannot be done without AI. Used in management processes and in machines, AI is used in all areas from booking a ticket right up to the point of takeoff, even in the flight operations, making air transport cost-effective, safe, fast and efficient.

Gaming

TV games, computer games, even mobile gaming, is all on a whole new level thanks to AI. Gaming bots provide huge amounts of entertainment and one of the best examples of AI int eh gaming industry is virtual reality.

These are just some of the uses of AI and all very good reasons why the use of artificial intelligence is so important in the modern world, taking our lives and businesses to the next level and the future looks even brighter with every new advancement in AI.

Can Machines Really Learn and Why Does It Matter?

Right now, AI is one of the hottest buzzwords but, whether you consider Alexa, Siri, auto-correct on your smartphone, or Cortana, we are not yet at the stage where we are creating all-purpose AI. What we are creating is programs that have the capacity to perform narrow and specific tasks.

Whenever you hear that a new AI feature has been brought out by a company, what it means is that the company has built a neural network using machine learning. Machine learning, or ML, is nothing more than a technique whereby machines can learn how to improve on a given task.

The ‘artificial intelligence’ we read about in books or see in the latest sci-fi movies is not the artificial intelligence we use. We don’t yet have robotic brains that can think and understand everything, responding in the same way as a human does.

That’s not to say we won't have that in the future – the signs all point to it being a very high possibility. Cortana, Alexa, and Siri don’t understand you in the way another human would; in fact they don’t really understand you at all. What they are is trained to do one specific task and do it well, provided the data they need to learn is given to them by humans.

Machine learning is about task assignment. It’s about allowing a computer to determine what the most efficient way of dealing with the task is. And, because a computer doesn’t really understand, you can end up with a different problem to the original on being

learned instead. Some examples of how AI has learned how to 'game the system' include:

- A game where an agent will kill itself off at the end of level 1 just so it doesn't lose in level 2

- Because AIs would die in a game if they lost, they developed ways of crashing games so they didn't die.

- Neural nets developed for the classification of poisonous and edible mushrooms, took full advantage of the fact that the images were presented in alternating order; as such, they didn't learn any of the image's input features. Had the order of the images been changed, the model accuracy would have been significantly lower.

All this might sound very clever but not one of the networks understood what it was meant to do. They simply learned how to accomplish the task in the quickest way possible, not necessarily the most efficient or the right way.

As far as machine learning goes, computers are given data and evaluated on how they perform on that data; they are not programmed to do something specific. Take image recognition, for example.

Let's assume that we have a series of images and we want the networks trained on identifying images with cats. We could provide a million or more images, some of which will have cats and some won't. Those with cats in ae labeled as such and the computer will simply train itself how to recognize what a cat looks like, based entirely on that specific set of images.

That process trains a neural network, a computer program that has several layers for the data inputs to pass through. Each layer will assign the input with a weight and a probability before a final determination is made.

These networks are modeled on the way we assume a human brain to work, with the layers representing the way the brain thinks about a task. We already know which images have cats in them so we can put these photos through the network and see what the result is.

Where the model incorrectly identifies an image, a mechanism is in place to tell it the decision was wrong; by making adjustments and continually trying a task until it gets it right, the computer 'learns' whether an image contains a cat or not.

This is automatic and, with enough structured data and the right software, a computer can train itself – this s what we know as AI. What you don't have is a computer that

actually understands what a cat is; it has just learned whether or not one appears in an image.

We use machine learning for many different tasks, such as speech recognition; Siri, Cortana, and Alexa, can understand voices simply because of ML techniques they were trained on to understand speech; massive amounts of samples are used for training them on and they learn to understand sounds that correspond to specific words.

Then you have the self-drive cars, again trained on ML techniques to identify certain objects and how they should respond to them.

In short, yes, a computer can learn but it won't understand what it is doing, For now, it will simply carry out a specific task it has been trained to do, nothing more, nothing less. In time, this will change and, in the future we will almost certainly see machines that can think for themselves.

What Is the Fourth Industrial Revolution and How Is It Related to Artificial Intelligence?

Artificial intelligence is often called the 'fourth industrial revolution' and, over the next 10 years, it is expected to transform our lives and our jobs.

However, AI is by no means a new concept. We can trace its roots back to computers in the 70s and 80s, computers programmed by humans with expert knowledge to use given facts to make decisions.

The difference between then and now, the one thing that is enabling the fourth industrial revolution is machine learning.

No more are computers only able to capture explicit knowledge through a series of logical steps provided by human input. Now, they have tacit knowledge, the intuitive and the know-how from the human mind.

Data is the Fuel

Already, we are surrounded by machine learning. We can unlock a smartphone just by glancing at it or touching it. We get music and video suggestions based on what we watch or listen to and cars are now being taught to drive themselves.

And the one thing that underlies all of this is data – the huge amounts of data we produce, growing by the day and, by next year, the estimate is that every single human being will be producing over 1.5 MB of data every second.

There will be an estimated 50 billion connected smart devices, each developed to collect data, to analyze it and share it, data that is vital to artificial intelligence. In the same way that humans learn through experience, machine learning models must be trained on this data.

AI is, quite simply, a journey that begins with identification and understanding of data – of where it comes from, how it can be accessed, and so on.

Not all this data will have a structure and some will need serious refinement and it won't all be in easy-to-access sources. Fusing the data together is important to allowing the analytics tools to look at it, to identify patterns using different analytics techniques.

Only when those steps have been done can we begin to enter the realm of AI to look into the past and use the information gained to make future decisions, to help us solve problems and increase performance and efficiency. After that, AI is limited by just one thing – data availability.

An example that most businesses can relate to is people management. Employee data can be fused with payroll date, training and absence records, performance and so on, providing as complete a picture as possible of each employee and how they interact with the business.

Managers can see performance at a glance and see where improvement is needed. AI could then be used to predict which employees might need some intervention, i.e. with the highest performers to find a way of keeping them within the organization and so on.

Data Sharing

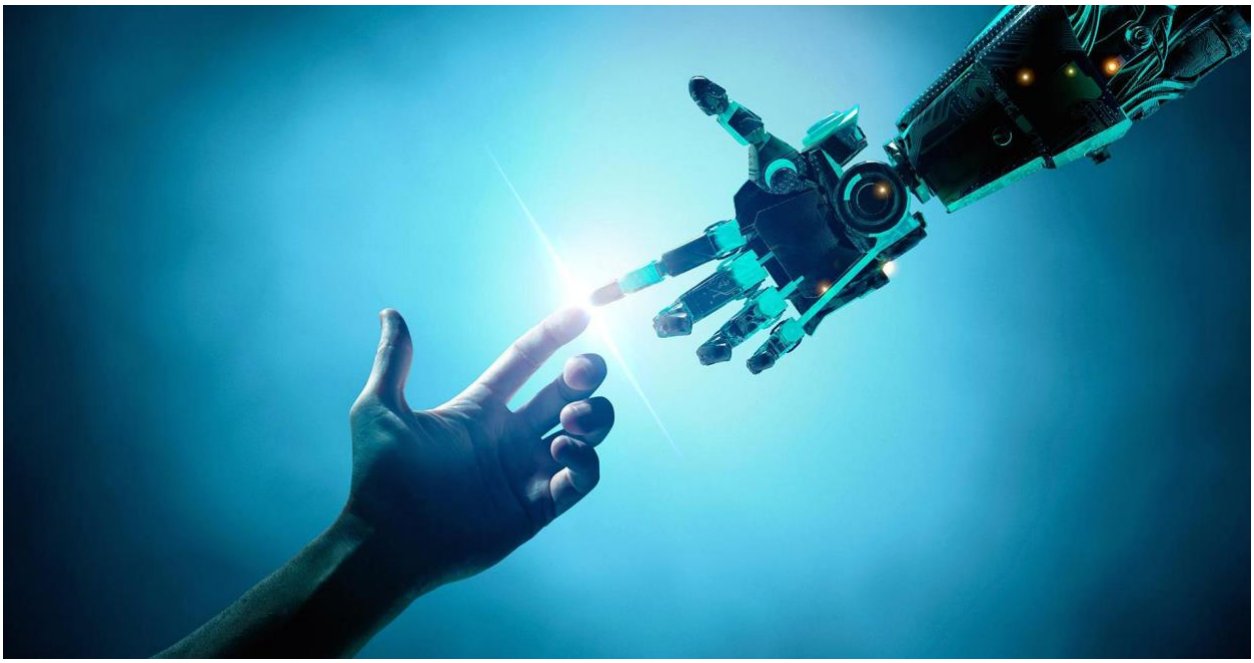
Data sharing affords massive opportunities, for example between government agencies but that raises the question of privacy and protection of customer data.

Predicting the future is another step, such as predicting when a crime might happen and where, so the police can direct resources where they are needed. And ML algorithms can be used to automate fingerprint and facial recognition, to find crime hotspots and so on.

This is down to patterns in the data, in images and in sound. Smart streetlights are being built, monitoring weather, light, sound and lots of other variants in the environment; with M models being built to detect a gunshot from the sounds of the city, could that ability be passed to these streetlights?

Perhaps the most important thing is the quality of the data in use. IBM has recently launched an AI tool to be used for monitoring the deployment of AI and see how accurate it is, how fair their decisions are and whether they are biased or not. In short, we have AI models assessing AI models.

All we can hope for is that the data these models are built on is correct and of good quality. If the data that underlies these systems is flawed how can we possibly expect accuracy from our AI models? That is why AI has moved into analytics – the digital future is heavily invested in the fourth industrial revolution being successful.



What Are the Most Common Advantages and Disadvantages of AI?

Artificial intelligence is fast-growing in its use, with most, if not all, industries either testing it or using it already. Given that it is all about the design of machines or programs that can think and make decisions, it doesn't take long to see that, while there are definite advantages to the use of AI, there are also some disadvantages too.

The Advantages

- **Fewer Errors –** because previously provided information is used, using specific algorithms, AI can reduce errors and achieve much higher accuracy, especially once human error is taken out of the equation.

- **Faster Decisions –** AI models enable extremely fast decision-making. For example, consider a chess game where you play the computer – it is almost impossible to beat it because AI technology powers it, allowing it to use algorithms to determine the best step in the fastest time.

- **Daily Applications –** we use AI whenever we use voice assistants like OK Google, Siri, Cortana, and Alexa to communicate with our computers or mobile devices.

- **No Emotion –** because we eliminate human emotion, computers can think logically and take the most efficient course of action

- **Digital Assistants –** many of the most advanced organizations in the world interact with users by way of digital assistants. This reduces the burden on human resources and digital assistants are on hand 24/7. Chatbots are the perfect example, with many of them incredibly human-like in their responses.

- **No Need for Breaks –** where humans need to take regular breaks, machines don't. They can work 24/7 365 days a year without any trouble.

- **Medical Applications –** AI ins increasingly being integrated into medical applications, increasing treatment efficiency and reducing the risks of misdiagnosis. AI has already started to transform surgical robotics, with robots now able to carry out semi-automated surgery with much better efficiency. It won't be a replacement for doctors or surgeons but it can increase efficiency by ensuring the right data is on hand for doctors to make the decisions.

- **Risk-taking –** there are situations where AI robots can take the place of humans to reduce risk. For example, space exploration, bomb disposal, oceanic exploration and many more situations where humans either cannot get to or would be at great risk.

- **Public Utilities –** Facial recognition for security, self-driving cars and natural language processing are just three ways that AI can benefit the world.

The Disadvantages

- **It's Expensive –** both the software and the hardware must be the most up to date and they must be powerful. Plus there are repair and maintenance costs to take into account.

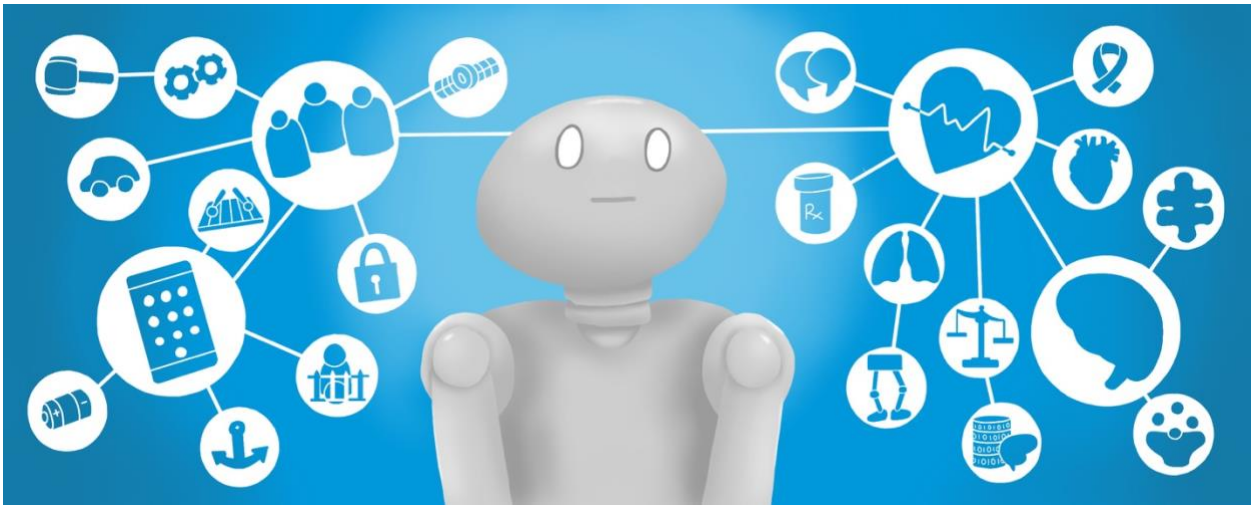
- **Unemployment –** The more machines we use to do jobs, the fewer humans are needed and that leads to a rise in unemployment. Machines don't need breaks and they can work 24/7 which is a huge benefit to industries but not to the human race. Plus they are less error-prone than humans.

- **Unable to Think Outside the Box –** where humans can do this, machines can only do what they are programmed to do, nothing more. They are not creative where the human mind is and they have no emotion which can lead to thoughts. Humans experience thousands of thoughts which lead to ideas; computers don't.

- **No Sympathy or Compassion –** while machines may be far more efficient, they lack the emotions that go into teamwork and they are unable to form bonds.

- **Machine-Dependency –** we are, to a large extent, dependent on machines for our day-to-day living and, the less we use our human thinking abilities, the less we will need them; eventually, humans will not be able to think for themselves.

There are those that claim, if AI falls into the wrong hands, it could end up destroying civilization as we know it. Right now, although there are advantages and disadvantages to what we have, there are no AI applications of a scale that could do sufficient damage. We should enjoy what is being developed but be careful not to lose what we already have.



Part 2: How AI Is Affecting Us Right Now

What Are Some Common AI Applications for Digital Marketing?

Artificial intelligence is in almost every part of our lives in one format or another and one area where the future looks incredibly bright is in digital marketing. It can be used to solve a multitude of problems faced by digital marketers, providing invaluable insights by bringing all your data together in one place.

How AI Can Boost Digital Marketing

These are some of the ways that AI can give digital marketing a new lease of life:

1. **Predicting Customer Behavior**

Propensity models and other statistical scorecards can be used to identify prospects most likely to respond to contact or offers. This is crucial for those who use AdWords as it can help define campaign objectives and target audience; the tool can also recommend strategies you can use to achieve your goals.

Predictive analysis can also help digital marketers to gain information for the purpose of predicting patterns and trends, analyzing huge volumes of data in an incredibly short time.

2. **Use AMP to Reduce Load Time**

AMP, or Accelerated Mobile Pages, ensures that your content shows up in the most strategic places, such as News Carousel, increasing the chance of you reaching the top three Google search results.

3. **A Personalized User Experience**

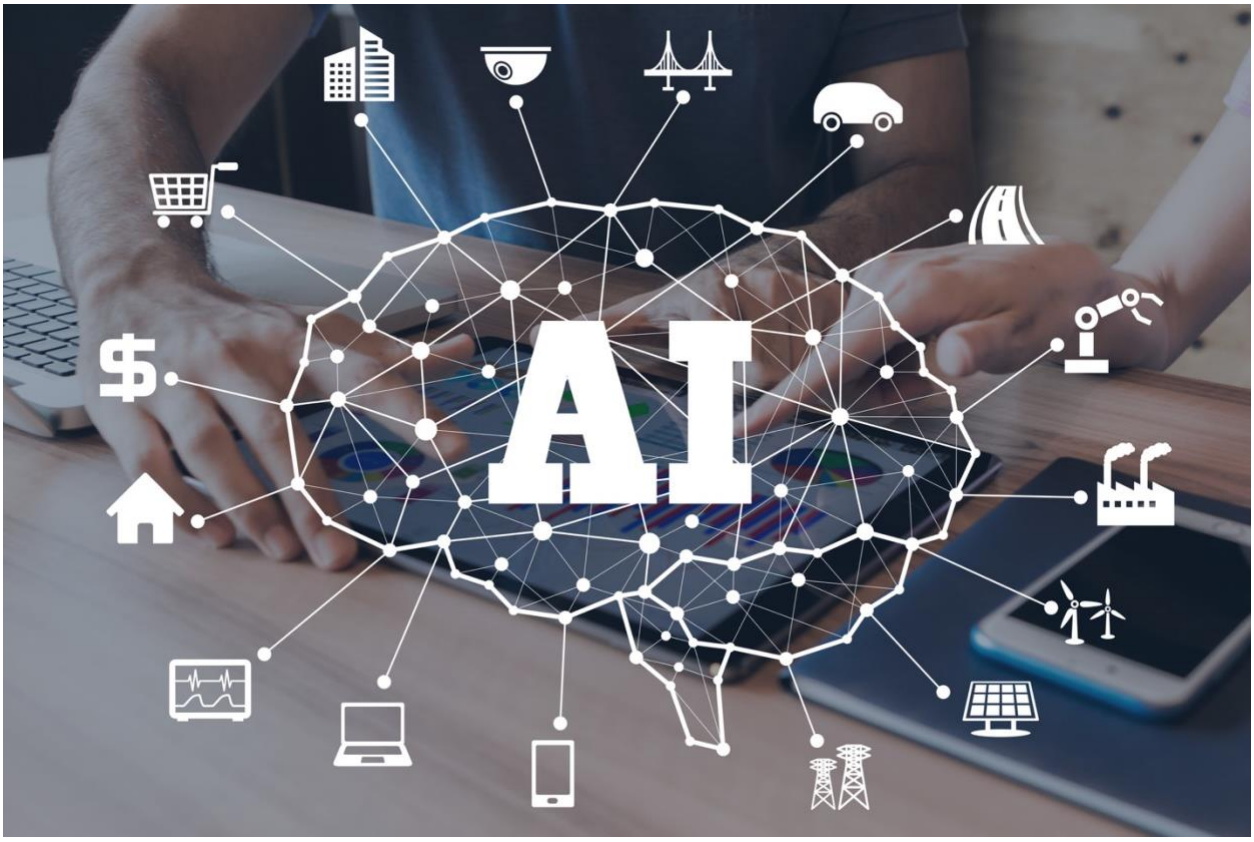
Use of AI means that data point analysis is much easier. Personalized offers and content can be shown to each of your prospects through the analysis of their device, location, demographics, previous integration and so on. Plus email marketing can be automated and push notifications sent regularly to prospects based on that analysis.

4. **New Marketing Opportunities**

Machine learning is powerful, analyzing vast amounts of data in very short timescales. It can analyze activity and search queries across millions of different websites to work out when a customer may be closing to pressing the Purchase button, resulting in you being able to target them with personalized ads.

5. **Scaled-Up Content Marketing**

AI is incredibly useful for content focused on data, such as sports matches, quarterly financial reports, market data and so on. Right now, there is just one AI platform for the creation of enterprise content and it's called Acrolinx. A power tool in the AI toolbox, Acrolinx is already widely used by Microsoft, IBM, Facebook, Caterpillar, and Nestle, among other big brands, to create content.



AI Applications for Digital Marketing

Not so long back, marketers showed no interest in integrating Ai with their digital strategies but that has all changed. With more results being produced from AI models, marketers now have the confidence they need to use it and, indeed, the following have been identified as being revolutionary in the future of digital marketing:

1. **Creating and Generating Content**

While AI can't actually write or create blog posts on the best ways to attract sales, some AI-generated content can be useful in some areas and can help attract traffic to websites.

For example, AI-generated news and reports based on existing information and data can be used, reducing the amount of time humans need to spend on the process. There are tools such as Quill, Articoolo, and Wordsmith, used by Forbes and the Associated Press for the purpose of creating news articles and those articles generate clicks on their websites.

2. **Online Searches**

The way we search for online content has changed and this has led to marketers needing to create better websites, optimized for online searching. Two major AI advancements

have been made in this area – search engine optimization and revolutionized online searches. Other advances include RankBrain, the Google algorithm and voice search. Then we have Siri, Cortana, Google Home, Alexa and Echo, all making online searches simple with a voice command or a touch of a button.

3. **Predictive Analysis**

Marketers have one main job – to produce content of a high-quality. This is the way you bring in your readers and gain plus points from Google. AI can help with predictive analysis by analyzing data to predict what readers want to see.

4. **Use of Chatbots**

Chatbots are an excellent way of automating responses, especially to frequently asked questions. They can provide customers with guidance, with a useful way of searching for whatever they want and they can answer open questions. Chatbots use NLP (natural language processing), together with machine learning to produce the right responses.

5. **Website Design**

If you don't have a website designer or a programmer, you can use Grid. A program that makes use of AI, Grid uses information you prove, such as calls to action, images, text, and more, to produce affordable, professional-looking websites.

6. **Digital Advertising**

Last but by no means least, digital advertising is the number one area for AI adoption. Take the Google Ad platform, for example; it uses AI and machine learning to find those who are most likely to do what the advertiser wants them to do and this is done through analysis of the user data, such as what they like, location, demographics, etc., to learn who the best prospects are.

At the end of the day, AI can benefit digital marketing in multiple ways. It is efficient, it can save time and money, there is less chance of errors, and it can result in some real breakthroughs for marketers everywhere.

How Can I Apply AI in My Life?

AI may make you think of Data in Star Trek, or Haley Joel Osment in the movie, AI, but the everyday impact of AI goes much further than any science fiction movie, book or tv series could ever suggest.

By the year 2030, there is the potential for AI to bring over $15 trillion to the global economy and, every day of your life, you use or encounter some form of it. How many times have you been on Amazon and had books suggested to you, based on your reading?

Or on Netflix, movies or shows recommended based on your previous viewing? Those suggestions come from algorithms that learn what you watch or read and then use them to recommend something else. Behind those algorithms lies artificial intelligence.

When you open your email, simple AI is at work, filtering incoming mail and putting spam in another place. The algorithm learns what is likely to be spam by reading the email content and it learns based on your own preferences.

But AI goes a whole lot further than just books, movies and spam email. It has an impact on so many different areas of your life already.

Virtual Assistants

Do you use Cortana? Siri? Alexa? What about Google Assistant? If you do, you use AI. Voice assistants are trained to find information, answer your questions, even control another app, all by learning from gathered information and how you make use of it.

Financial Companies

If you have a bank account or a credit card, AI has an impact on your life. Thousands upon thousands of card and bank transactions take place every single day and the man-hours required to go through them all would be, frankly, stupid.

Anomalies would take too long to find and human error dictates that some will be missed and that could result in your bank account being emptied. Banks and credit card companies use AI for this sort of work; machines can process information faster, they can see payment patterns, and they can alert you if any suspicious activity happens on your account.

Airplane Autopilot

Are you a frequent flier? Then consider the technology behind the autopilot. On average, a pilot flying a Boeing 777, for example, will actually spend just 7 minutes on manual flying. The rest of your journey is flown on autopilot – AI possibly at its best. GPS and

motion sensors track the flight position to keep the plane on track, and some planes are even landed on autopilot and most passengers don't have a clue – well, you do now.

AI Is Already Here

In many parts of your day to day life, artificial intelligence is already being used. The internet, Netflix, Amazon, email, your bank, even your flights; almost everything you do has some form of AI powering it. The biggest question is this – are you and your business ready?

How is Artificial Intelligence Transforming Finance?

Over the years, financial institutions have changed – they've had to, just to keep up with the times. Technology is now widely used in the sector, replacing humans in many jobs. Not only are customers experiencing much better customer service, but financial industries are also seeing a boom in revenue, more optimized working processes, lower costs and less fraud.

To date more than $4 billion has been invested in AI startups in the financial sector and this figure will increase exponentially over the years as more firms take the road that leads to digital transformation.

Some of the most important ways that AI is transforming the financial industry include:

- **Data Mining –** AI systems can use existing information to make insights and financial institutions use these insights to make decisions, such as whether to accept an application for a loan, bank account, credit card and so on. Data mining modules are proving to be extremely efficient and cost-effective in cases where they have already been used.

- **Effective Credit System –** it has always been difficult for a bank to determine if a creditor was likely to default on a loan or mortgage but, with AI technology, it is much easier to determine the potential for default and ensure that the proper guidance is used when loans are issued.

- **Consumer Information –** Customer data protection is one of the biggest challenges faced by the financial sector and, while regulations are in place to determine the correct use of data, compliance has proved a real sticking point, simply because there are no measures to monitor compliance. With AI technology, the use of consumer information can now be tracked, right down to how it is shared, ensuring compliance with regulations.

- **Fraud Prevention –** the sheer number of AI models for data mining and monitoring for irregularities has led to a significant decrease in fraudulent activity and false positives – because they are found so quickly, they can be addressed much quicker.

- **Trading Insights –** AI technology can provide financial institutions with valuable insights and much more effective trend-spotting, giving them the ability to act fast on the trends and make better business decisions.

- **Customer Satisfaction –** AI systems are constantly evolving to ensure customers get the highest level of satisfaction. For example, Chatbots allow some processes to be automated, to provide financial guidance based on the insights they gain from customer information.

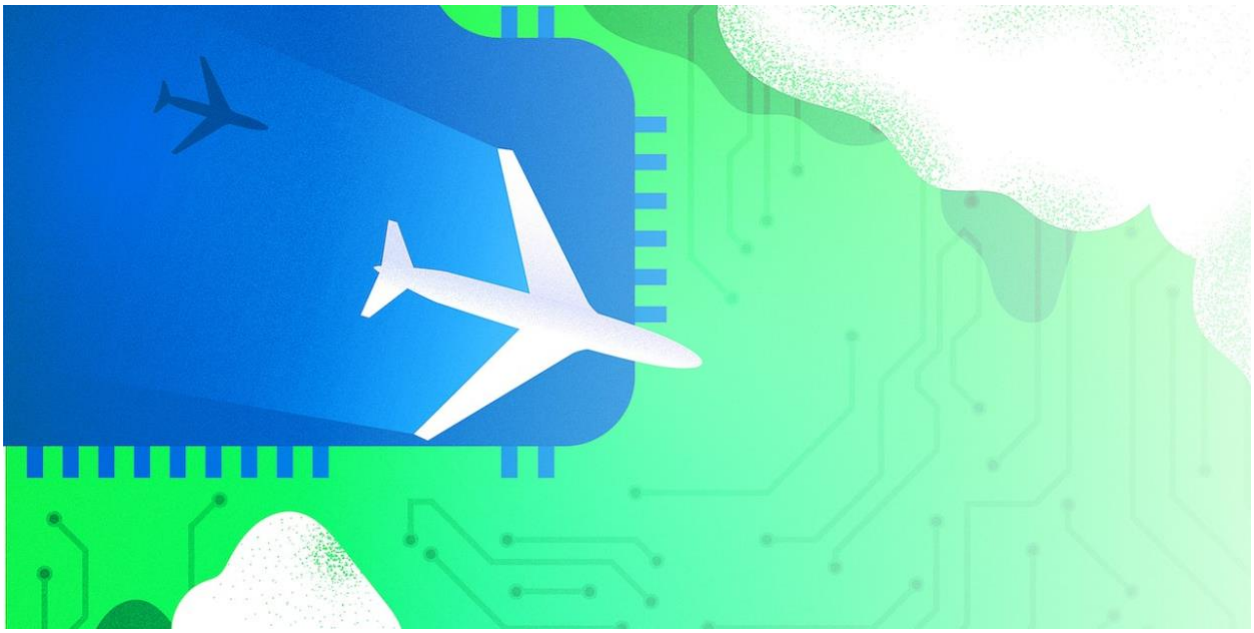
AI Applications In the Financial Sector

AI may be an emerging technology but pretty much all financial institutions use it in some form or another. Improved customer service and a personalized touch are just two reasons why banks love it and they use it in these ways:

- **Chatbots –** trained to efficiently answer queries while keeping as human a touch as possible.

- **Mobile Banking –** most people use it now and AI is used to improve the service you receive from your mobile banking app. Based on patterns in your data, you may be given financial tips, offered services or products and most banks have discovered that introducing AI has improved customer satisfaction, not just personal but business customers too.

Artificial intelligence is, without a doubt, the future of finance. Things may well still be in the early stages but the benefits dictate that, in the next few years, AI will be at the heart of the financial industry.



How Will Artificial Intelligence Modernize the Travel Industry?

There is no doubt that the travel industry has and always will be one of the forerunners in adopting new technology, especially digital technology. Travelers are just as enthusiastic, adopting changes that will enhance their travel experience significantly and this has resulted in a huge level of innovation in business models like Uber and Airbnb.

The travel industry also welcomed websites with open arms, making them their primary method of reaching their customers. That moved onto mobiles, with the adoption of a mobile-first attitude, and now we are teetering on the edge of the next wave of technology – artificial intelligence.

The travel industry is now taking an AI-first approach, pinning their hopes on the fact that relevance will be the major influencing factor. AI is being used to great effect for predicting travel choices, making suggestions, personalizing customer services, booking travel and managing customer requirements before, during, and after travel.

Some examples include:

- KLM and other airlines have started to use AI for dealing with queries via social media. By the end of 2017, the KLM system was dealing with around half of received inquiries.

- The Dorchester Collections hotel operator made significant changes to their breakfast menu after they used AI to analyze reviews left by guests and came up with options to customize the menu.

- An iOS travel app called Lola used a combination of human agents and AI to assist users with flight schedules, booking hotels, and restaurant advice.

The biggest question right now is, just how can AI make significant changes to the way we manage and deliver travel and the answer lies in four areas that AI can be used to provide better customer experience and better assistance.

1. **Voice and Conversation-Based Digital Assistants**

These days, travelers can do just about everything they want on a website – plan their trip, compare prices and options, set budgets, book and cancel travel. But, to do this, they must go through reams of instructions, descriptions, terms and conditions, even user reviews before they make a decision. The alternative option is conversation-based apps that can significantly cut down on how much interaction is needed simply by taking context and intent into account.

An example would be a chatbot. One simple text line asking for flight options for a certain data and destination or a request to use frequent flyer miles to pay for a flight would be enough. Chatbots using NLP could also provide a far more personalized service by using AI for context. For example, you could be in the lobby of a hotel and say, in your language, something like “I’m hungry, find me something to eat”. The chatbot would scan the hotel menus, check them against your registered preferences, and help you to place an order. If you then went to your room while the order was being placed, the chatbot would automatically make sure your food was sent to your room.

Both AI and NLP can bring about significant changes to travel and travel-related inquiries. And the best thing about systems like this is that they are almost infinitely scalable, a critical factor, especially in the travel industry.

2. **Facial Recognition Backed by Blockchain**

It’s a well-known fact that, to travel anywhere, especially out of the country, your documents need to scrutinized by many different people. Getting on and off your chosen travel mode brings its own complexities, particularly cruise ships. Using facial recognition, travelers would be able to get about airports, ports, immigration, customs and get on an aircraft or ship without having to stop at multiple points to have their documents checked. Add blockchain into the equation and customers will find it much easier to visit duty-free stores, restaurants, even entertainment centers with just one facial scan. The addition of blockchain technology ensures traveler data is trustworthy

and reliable and is made immediately available so transactions can be completed quickly.

3. **The Hidden Persuader – Machine Learning**

It's apparent that most airports and airlines are attempting to emulate the large retail outlets, selling everything you could possibly think of, from seats on transport, to blankets, even hotel rooms. Machine learning is on the fast track as a hidden persuader in sales and, by combining machine learning with big data, airlines can now produce recommendation engines for personalized offers from their own and partner catalogs.

The application of machine learning within the travel industry is starting to provide powerful capabilities for messages and product bundling based on traveler propensity and context. This is very important; customers expect providers to know them and to offer a tailored service and deals based on previous travel. Personalization in travel offers is one of the key areas for improvement, given that it can inspire loyalty in customers.

But that's not all. Machine learning can also use customer data from external sources to be proactive in helping travelers to make speedy decisions, for example, if travel is disrupted by a large storm front. The Connected Traveler framework from Mindtree, for example, makes use of machine learning to help them understand travelers, integrating travel data drawn from multiple apps, and creating transparent, 360° views of trends and behaviors that can, ultimately, result in better loyalty and higher conversion rates.

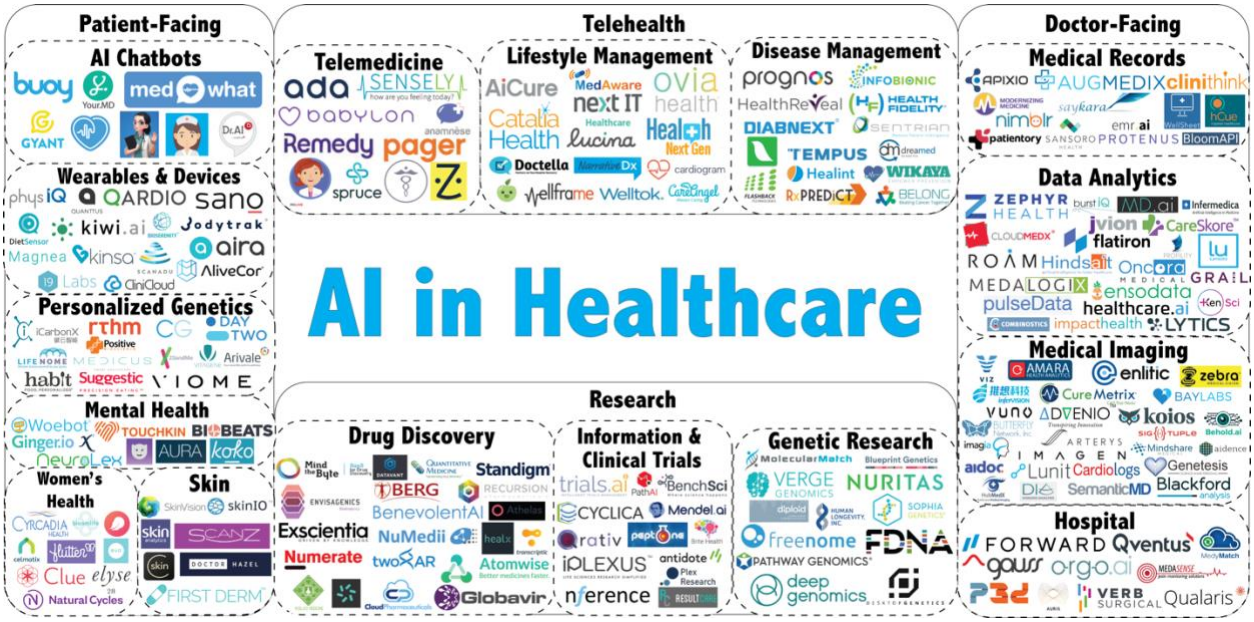
4. **Using Social Media for Sentiment**

There are probably far more social media listening tools than you ever thought possible and one that is interesting to the travel industry is a subset of tools aimed at travel applications. These tools are used for deciphering sentiment and relating it to journeys taken by customers, whether before, during or after traveling.

They analyze customer frustrations because of flight delays, or by hotel rooms that don't meet expectations. Some customers take to social media to vent their frustrations and listening tools analyze their intent and context, reaching out with intervention at the right time to bring about a positive impact.

This intervention could take the form of giving customers extra information, so the customer understands the situation better, right down to providing options, such as good deals on future travel. This can result in more customer loyalty and can be achieved using bots powered by AI to trawl through unstructured data, using NLP to make the right response to a customer through digital channels.

These are just four AI applications that are already starting to transform the travel industry and all of them have one common denominator – they all cut down task completion times while ensuring outcome and process accuracy. In a time-critical industry, with ever-changing information, those capabilities are invaluable.



How is Artificial Intelligence Improving Health Care?

Fans of Star Wars: The Empire Strikes Back, will remember Luke Skywalker being rescued from Hoth and taken to a medical facility, staffed by advanced robotics and technology that belongs way in the future, where he is brought back from the brink of death.

Of course, that really does belong in the movies but only for now. There is every indication that the healthcare industry will be subjected to highly technological changes, starting with the adaptation to electronic health records. Artificial intelligence is improving with every month that passes and applications built on AI could soon become the healthcare system of the future. It looks inevitable and it could be here much sooner than we think.

Right now, AI is a new technology, ever-evolving, especially in industries like healthcare where adoption is still quite low. As machine learning and AI tool have improved in sophistication, so their cases have grown but still adoption within healthcare remains very low.

Right now, the industry is at the stage where they are still trying to figure out where AI can fit into their strategies. It has been used, in its early forms, in identifying billing process patterns but it has evolved way beyond that, using deep machine learning and big data to become far more sophisticated.

The modern applications for AI include a wide range of use cases, including cybersecurity and radiographic imaging. And, as applications improve, we could see a

shift across the entire industry with the following just some of the ways that AI is and can help to improve healthcare:

Diagnostics

If there is one thing that AI is good at, it is data categorization, especially after exposure to huge amounts of data. That gives AI great promise in the field of diagnostics – medical records, imaging analyses, genetics, and much more can all be used to provide more accurate diagnostic outcomes.

Not just that, AI tools can make use of similar data to come up with unique approaches to treatment and providing doctors with calculated recommendations.

Robot-Assisted Surgery

With robotic surgeries, surgeons can make use of much smaller surgical tools, and make their incisions more precise. Both surgeons and patients can also benefit from the use of AI with medical records being combined with real-time data from operations, while drawing on previous data form successful surgeries of the same or similar type.

It is estimated that, by 2026, the US healthcare industry could benefit from savings of $40 billion per year by using robotic-assisted surgeries powered by artificial intelligence.

Virtual Nursing Assistants

If you use Alexa or you know what it is and what it does, it's not a great leap of the imagination to think of virtual nursing assistants. These would behave in the same way as human nurses, reminding patients to take their medication, assist them with daily routines or give them appointment reminders, not to mention being able to provide answers to medical questions. In second place, behind robotic-assisted surgery, virtual nurse assistants could save the US healthcare industry an estimated $20 billion per year.

Administrative Workflow Assistance

Shoring up every hospital, doctor’s surgery, medical practice, and any other point of care, is an administration system, built on the mounds of paperwork produced from all these facilities.

Consolidation and digitalization of this paperwork were what led to the electronic healthcare system being adopted across the industry and AI is already starting to make its mark within these systems, being used to streamline functions of an administrative nature. It is estimated that, with the efficiency and productivity that AI can bring to the

administrative side of healthcare, savings in the region of $18 billion every year could be realized.

How is Artificial Intelligence Transforming the Transportation Industry?

Right now, the automotive industry is enjoying a significant level of investment, most of it on artificial intelligence and, more specifically, on optimizing self-drive technology, all aimed at the mass production of level-5 autonomous technology cars.

At the same time, a number of other companies claim that they play a leading role in transforming the automotive market – Tesla, making improvements to their Autopilot system, Uber, testing out Robo-taxis and Google, running programs on autonomous car development through a subsidiary company called Waymo.

Autonomous cars, trucks, smart containers, self-organizing fleets, smart cities and driver-less taxis – these are all examples of what the future holds for the transportation industry.

We already have the first transition to autonomous cars – advanced safety system technology is already available on some cars, such as auto-braking, alerts to lane deviations, understanding road signs and many more systems that can help keep drivers

safe from accidents. In the very near future, technology is expected to bring huge changes, both to vehicles and to the transportation ecosystem.

Very often, using advanced technology in the transport sector can run into difficulty because of unpredictable factors. Traffic, accidents, human error, none of these are predictable but artificial intelligence has definitely found a place in the transportation industry.

AI makes use of observed data to predict or even make the appropriate decisions. The integration of the technology has resulted in much lower labor costs, a solution to long driving hours, to breaks needed between drives, all with automated fleets.

With innovation like this, the future of transportation has already arrived and we expect to see companies rethinking their job descriptions in the future, working out when smart technology can do the job and when human intervention is required.

Plus, with industry-wide standards such as ACC (adaptive cruise control), ADAS (advanced driver assistance systems, and blind-spot alerts emerging, the growth of AI is expected to be fueled even further.

Some of the ways artificial intelligence is expected to impact the transportation industry positively (and already does in some cases), are:

Public Safety

AI can help transportation industry companies to ensure public safety when they use their services. For example, real-time crime tracking can help keep citizens safe when they use public transport in urbanized areas. This ensures the police are able to place resources where they are needed, increase efficiency and ensure regular patrols protect the public.

Autonomous Vehicles

Self-drive cars are the talk of the town right now and extensive testing is already underway. These cars use AI to function correctly and make decisions that are fully calculated. Already they are proving that accident numbers will drop and that productivity will be significantly increased.

Better Decision-Making and Planning

The road-freight sector can make good use of highly accurate prediction systems using AI to predict future volume. This makes their planning process simpler and there is also scope for decision-making tools to be designed using AI, which will have a productive and positive effect on investments made by transport companies.

Pedestrian Safety

With artificial intelligence, it is possible to predict the path that cyclists and pedestrians will take, helping to decrease road accidents and injury. This will lead to a more diverse use of transportation and a significant reduction in vehicle emissions.

Controlling Traffic Flow

Traffic flow has always had a significant impact on transport and not always positively. If traffic flow data could be adapted for traffic management models built on AI, traffic patterns could be streamlined and there would a huge reduction in congestion levels. And real-time tracking, together with smart algorithms for traffic lights could effectively control both high and low patterns of traffic. The same technique could be used to optimize the routes and schedules of public transport.

Thank you for downloading my free artificial intelligence eBook preview, I hope you enjoyed it. To get the full eBook and learn more about robotics, please head to http://www.unirobotica.com/AIbook-offer